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Building Elements

1 The present invention relates to elements for the
2 construction of buildings and other structures.
3
4 At present, conventional materials such as bricks
5 and cast concrete blocks are used in order to form
6 walls for buildings and other structures. The
7 normal method of building such walls is to lay a
8 layer of bricks or blocks and then apply a layer of
9 wet cement to the bricks before applying another
10 layer of bricks or blocks on top. This process is
11 repeated until the wall being built has reached the
12 desired height. Whilst building using such
13 materials is not a problem in locations where these
14 materials are freely available, this can pose
15 problems in areas where such items, or the raw
16 materials required to manufacture them, are not so
17 readily available. For example, the construction of
18 accommodation in third world countries or disaster
19 areas can be hampered by the lack of desired
20 materials and building blocks.

1
2 A further disadvantage of the aforementioned
3 conventional materials and blocks is that they are
4 inconvenient and costly to transport if it is not
5 possible to source or manufacture the required items
6 locally. This is a problem where speedy
7 construction of structures is required in remote
8 areas by, for example, the armed forces when seeking
9 fortifications in a new area.

10
11 It is an object of the present invention to mitigate
12 or obviate one or more of the disadvantages referred
13 to above.

14
15 According to a first aspect of the present invention
16 there is provided a blank for forming a building
17 element, the blank comprising:

18 an elongate body portion having first and
19 second ends and a plurality of transverse fold lines
20 which divide the body portion into a plurality of
21 panels, the panels each having first and second
22 longitudinal edges;

23 one or more first tab members extending from
24 the first end of the body portion; and

25 one or more first apertures adjacent the second
26 end of the body portion;

27 wherein each of said plurality of panels has at
28 least one second tab extending from said first
29 longitudinal edge and a side flange portion adjacent
30 said second longitudinal edge, and wherein each side
31 flange portion is provided with at least one second
32 aperture.

1
2 Preferably, each side flange portion is divided from
3 its respective panel by a longitudinally extending
4 fold line which extends along the length of the body
5 portion, the longitudinal fold line allowing the
6 side flange portions to be folded substantially
7 perpendicular to their respective panels.

8
9 Preferably, the body portion has an end flange
10 portion adjacent the second end thereof, the at
11 least one first aperture being formed in the end
12 flange portion. Preferably, the end flange portion
13 is divided from the body portion by one of the
14 plurality of transverse fold lines, the transverse
15 fold line allowing the end flange portion to be
16 folded substantially perpendicular to the body
17 portion.

18
19 Preferably, the ends of each side flange portion are
20 chamfered. Most preferably, each chamfer is at
21 substantially 45 degrees to the longitudinal fold
22 line.

23
24 Preferably, the body portion has three transverse
25 fold lines which divide the body portion into four
26 panels. In one embodiment, the transverse fold
27 lines are spaced such that the first and third
28 panels are substantially square. In an alternative
29 embodiment the transverse fold lines are spaced such
30 that each panel is substantially square.

31

1 Preferably, each first and second tab has
2 substantially right-angled corners. Alternatively,
3 each first and second tab has rounded corners.

4

5 Preferably, each panel is stamped to provide a
6 strengthening formation thereon. Preferably, the
7 formation is substantially X-shaped. Alternatively,
8 each panel is provided with a third aperture for
9 receiving a reinforcing means therethrough.

10

11 Preferably, the building element is a building
12 block.

13

14 Preferably, the blank is formed from sheet metal,
15 most preferably galvanised steel. Alternatively,
16 the blank is formed from a plastics material.

17

18 According to a second aspect of the present
19 invention, there is provided a building block formed
20 from the blank according to the first aspect of the
21 present invention.

22

23 According to a third aspect of the present
24 invention, there is provided a method of forming a
25 building block from the blank according to the first
26 aspect of the invention, the method comprising the
27 steps of:

28 folding each side flange portion along the
29 longitudinal fold line until each side flange
30 portion lies substantially perpendicular to its
31 respective panel;

1 folding the body portion along each transverse
2 fold line until adjacent panels lie substantially
3 perpendicular to one another and the first and
4 second ends of the body portion are adjacent one
5 another; and

6 locating the at least one first tab in the
7 corresponding at least one first aperture and
8 bending the at least one tab such that the first and
9 second ends of the body portion are secured
10 together.

11

12 According to a fourth aspect of the present
13 invention, there is provided a building element
14 comprising:

15 a body portion having first and second ends and
16 comprising a plurality of integrally formed panels
17 adapted to define the perimeter of the building
18 element, wherein each panel has first and second
19 longitudinal edges;

20 at least one first connecting member adapted to
21 be attached to the panels adjacent their first
22 longitudinal edges;

23 at least one second connecting member adapted
24 to be attached to the panels adjacent their second
25 longitudinal edges; and

26 a third connecting member adapted to be
27 attached to the body portion adjacent the first end
28 thereof;

29 wherein the first and second connecting members
30 are provided with first and second attachment means,
31 respectively, each of the attachment means being
32 adapted to attach the building element to an

1 adjacent building element, and wherein the third
2 connecting member is adapted so as to engage the
3 second end of the body portion.

4

5 Preferably, the building element further comprises a
6 fourth connecting member adapted to be attached to
7 the body portion adjacent the second end thereof,
8 wherein the third and fourth connecting members are
9 adapted so as to be mutually engagable.

10

11 Preferably, the first and second connecting members
12 are each formed from a single piece of material and
13 each is adapted to follow the perimeter of the
14 building element. Alternatively, the building
15 element comprises a plurality of first and second
16 connecting members attached to each longitudinal
17 edge of each panel.

18

19 Preferably, each of the connecting members is
20 attached to the body portion using an attachment
21 method selected from the group comprising riveting,
22 gluing and crimping. Alternatively, each of the
23 connecting members is provided with a plurality of
24 engagement teeth and each panel includes a plurality
25 of cells, the teeth being adapted to be inserted in
26 the cells. Preferably, each engagement tooth has a
27 first engagement portion projecting in a first
28 direction and a second engagement portion projecting
29 in a second, substantially opposite, direction.

30

31 Preferably, each of the second connecting members
32 includes a strengthening rib projecting therefrom.

1 Preferably, each of the first connecting members
2 includes a strengthening rib projecting therefrom.
3

4 In one preferred embodiment, the first attachment
5 means comprises at least one tab projecting from the
6 first connecting member, and the second attachment
7 means comprises at least one aperture adapted to
8 receive the at least one tab of an adjacent building
9 element. In an alternative embodiment, the first
10 attachment means comprises a first fastener element
11 and a detachable fastener member adapted to attach
12 to the first fastener element, and the second
13 attachment means comprises a second fastener element
14 adapted to receive a fastener member of an adjacent
15 building element. In a further alternative
16 embodiment, the first attachment means comprises a
17 detent projecting from the first connecting member,
18 and the second attachment means comprises a
19 resilient catch adapted to engage with the detent of
20 an adjacent building element.

21
22 Preferably, the third and fourth connecting members
23 are each provided with a resilient engagement member
24 adapted to engage with one another. Alternatively,
25 the third connecting member includes one or more
26 apertures therein, and the fourth connecting member
27 includes one or more tabs projecting therefrom for
28 engagement with the apertures in the third
29 connecting member.

30
31 Preferably, the body portion is formed from a single
32 sheet of extruded cellular plastics material having

1 a plurality of cells therein. Most preferably, the
2 plastics material is extruded cellular
3 polypropylene.

4

5 In one preferred embodiment, each connecting member
6 is formed from sheet metal. Most preferably, the
7 sheet metal is galvanised steel. Alternatively, the
8 connecting members are formed from a plastics
9 material. In further alternative embodiment, at
10 least one of the connecting members is integrally
11 formed with the body portion.

12

13 According to a fifth aspect of the present
14 invention, there is provided a blank for forming a
15 building element, the blank comprising:

16 an elongate body portion having first and
17 second ends and a plurality of first apertures
18 formed therein; and

19 first and second side portions integrally
20 formed with the body portion, each side portion
21 being divided from the body portion along a first
22 longitudinally extending fold line;

23 wherein each side portion has at least one
24 second longitudinal fold line which divides the side
25 portion into at least two sections, and wherein at
26 least one side portion has a plurality of tabs
27 extending laterally therefrom.

28

29 Preferably, the blank further comprises first and
30 second end flanges adjacent the first and second
31 ends of the body portion, each end flange divided
32 from the body portion along a transverse fold line.

1
2 In a preferred embodiment, the plurality of first
3 apertures are formed in two substantially parallel
4 lines extending longitudinally along the body
5 portion. Preferably, each of the first and second
6 side portions has a plurality of tabs extending
7 laterally therefrom. Preferably, the body portion
8 further includes a pair of second apertures, one of
9 the pair located adjacent the first end of the body
10 portion and the other located adjacent the second
11 end of the body portion. Preferably, the building
12 element is a door lintel.

13

14 In an alternative embodiment, the plurality of
15 apertures are formed substantially in a single line
16 extending longitudinally along the body portion.
17 Preferably, the first and second side portions each
18 have a pair of second longitudinal fold lines which
19 divide each side portion into three sections.
20 Preferably, the building element is a window sill.

21

22 Preferably the blank is formed from sheet metal,
23 most preferably galvanised steel. Alternatively,
24 the blank is formed from a plastics material.

25

26 Embodiments of the present invention will now be
27 described, by way of example only, with reference to
28 the accompanying drawings, in which:-

29

30 Fig. 1 is a perspective view of a part pre-
31 formed blank for forming a building block;

1 Fig. 2 is a perspective view of the building
2 block once formed from the blank of Fig. 1;

3 Fig. 3 is a top view of the formed building
4 block of Fig. 2;

5 Fig. 4 is a perspective view of the building
6 block of in Fig. 2 in use;

7 Fig. 5 is a cross sectional view of the
8 building blocks of Fig. 4 along line V-V;

9 Fig. 6 is a perspective view of a modified
10 version of the block of Figs.1-5;

11 Fig. 7 is a cross section view of a wall formed
12 from a number of the modified blocks shown in Fig.6;

13 Fig. 8 is a side view of the part pre-formed
14 blanks of Fig. 1 as stacked for storage.

15 Fig. 9 is a plan view of a blank for forming a
16 door lintel;

17 Fig. 10 is a perspective part cut-away view of
18 the formed door lintel;

19 Fig. 11 is a cross sectional view of the formed
20 door lintel of Fig. 10 along line XI-XI;

21 Fig. 12 is a perspective view of the door
22 lintel of Figs. 10 and 11 in use;

23 Fig. 13 is a plan view of a blank for forming a
24 window sill;

25 Fig. 14 is a perspective view of the window
26 sill of Fig.13 in use;

27 Fig. 15(a) is an exploded projected view of a
28 second embodiment of a building block;

29 Fig. 15(b) is a projected view of the building
30 block of Fig. 15(a) when formed;

31 Fig. 15(c) is a plan view of the building block
32 of Figs. 15(a) and (b);

1 Fig. 16(a) is a projected view of a third
2 embodiment of a building block;

3 Figs. 16(b) and (c) are vertical section detail
4 views through the base and top, respectively, of the
5 building block of Fig. 16(a);

6 Figs. 16(d) and (e) are horizontal section
7 detail views showing alternative joint arrangements
8 for the corners of the building block of Fig. 16(a);

9 Fig. 16(f) is a vertical section detail view
10 showing the attachment means for attaching adjacent
11 blocks of the type shown in Fig 16(a);

12 Fig. 17(a) is a vertical section detail view
13 showing an alternative attachment means for
14 attaching adjacent blocks of the type shown in Fig.
15 16(a);

16 Fig. 17(b) is a horizontal section detail view
17 of a further joint arrangement for the corners of
18 the building block of Fig. 16(a);

19 Fig. 17(c) is a detail view showing stacked
20 blanks for forming the building blocks of Fig. 17;

21 Fig. 18(a) is a projected detail view of a
22 fourth embodiment of a building block;

23 Fig. 18(b) is a horizontal section detail view
24 of a corner joint of the fourth embodiment of
25 building block; and

26 Fig. 18(c) is a vertical section detail view
27 showing the attachment of adjacent blocks of the
28 fourth embodiment.

29

30 Referring to the drawings, Fig. 1 shows a blank, or
31 body portion, 10 from which a building element is
32 formed. In this instance, the building element is a

1 building block 12. In this embodiment, the blank 10
2 is either cut or punched from a sheet of galvanised
3 steel, although it should be understood that any
4 other suitable sheet metal or plastics material may
5 be used.

6

7 The blank 10 is divided into two end panels 14,16
8 and two side panels 18,20 which are integrally
9 formed and connected along three fold lines 22 which
10 extend laterally across the blank 10 at intervals
11 along the length of the blank 10. The fold lines 22
12 are formed by perforations made in the blank 10 to
13 aid folding during assembly, as will be explained
14 below.

15

16 Each of the end and side panels 14-20 has an
17 integral side flange portion 24. Each of the side
18 flange portions 24 is formed on the same first
19 longitudinal edge of the blank 10, as shown in
20 Fig.1. Each side flange portion 24 is connected to
21 its respective end or side panel 14-20 along a fold
22 line 23. Each fold line 23 is created by scoring or
23 using a similar technique on the surface of the
24 blank 10. Fig.1 shows the blank 10 once the side
25 flange portions 24 have been folded along the fold
26 lines 23 such that they lie substantially
27 perpendicular to their respective end or side panel
28 14-20. Each side flange portion 24 is also provided
29 with chamfers 26 at either end thereof to allow the
30 blank 10 to be formed into a cuboid shape, as will
31 be described below.

32

1 The side flange portions 24 further include tab
2 receiving slots 32 formed adjacent the fold lines
3 23. In the illustrated embodiment, each end panel
4 14,16 has one tab receiving slot 32, and each side
5 panel 18,20 has two tab receiving slots 32.
6 However, it should be appreciated that each panel
7 14-20 may have any number of tab receiving slots 32,
8 as desired.

9

10 The end and side panel 14-20 also include integrally
11 formed tabs 34 which lie on the second longitudinal
12 edge of the blank 10, opposite the side flange
13 portions 24 formed at the first longitudinal edge of
14 the blank 10. The tabs 34 protrude laterally from
15 each panel 14,20 so as to be engagable with tab
16 receiving slots 32 in an adjacent block (not shown).
17 In the illustrated embodiment, the end panels 14,16
18 each have one tab 34, whereas the side panels 18,20
19 each have two tabs 34. However, it should be
20 appreciated that each of the panels 14-20 may have
21 any number of tabs 34 as desired.

22

23 The first end of the blank 10 on the side panel 20
24 further includes an end flange portion 38. The end
25 flange portion 38 is formed integrally with the side
26 panel 20 and are connected along a fold line 40. As
27 with the fold lines 23 described above, the fold
28 line 40 is formed on the blank 10 by scoring or a
29 similar technique. Prior to final assembly, the end
30 flange portion 38 is folded along fold line 40 so
31 that it lies substantially perpendicular to the side
32 panel 20, as shown in Fig.1.

1
2 The end flange portion 38 further includes tab
3 receiving slots 42 formed on the end flange portion
4 38 adjacent the fold line 40. These tab receiving
5 slots 42 are intended to receive tabs 44 integrally
6 formed at the second end of the blank 10 on end
7 panel 14. The tabs 44 protrude longitudinally from
8 the end panel 14 and are adapted to be engageable
9 with the tab receiving slots 42. Although the end
10 panel 14 and end flange portion 38 are illustrated
11 as having two tabs 44 and two slots 42,
12 respectively, it should be appreciated that any
13 suitable number of tabs 44 and corresponding slots
14 42 may be used.

15

16 Fig. 2 illustrates a building block 12 formed from
17 the blank 10 shown in Fig. 1. In the illustrated
18 embodiment, the building block 12 is formed into a
19 substantially cuboid shape by folding each of the
20 panels 14-20 along the fold lines 22. Thus, the end
21 and side panels 14-20 each form a face of the
22 building block 12. The building block is secured in
23 this form by engaging the tabs 44 of the end panel
24 14 with the tab receiving slots 42 of the end flange
25 portion 38. The end panel 14 lies flush with the
26 side flange portion 38 and the tabs 44 are first
27 manipulated so as to protrude through tab receiving
28 slots 42 and then bent back to fix the end flange
29 portion 38 and end panel 14 together. Depending on
30 the thickness of the sheet of material being used,
31 the tabs can be manipulated either by hand or else
32 by using a suitable tool.

1

2 As best illustrated in Fig. 3, the chamfered side
3 flange portions 24 of the blank 10 form a base for
4 the building block that provides additional
5 strength. Fig.3 also shows the arrangement of the
6 slots 32 on the side flange portions 24 once the
7 blank 10 has been formed into the building block 12.
8

9 As illustrated in Fig. 4, the building block 12 of
10 Fig. 2 forms one block of a wall 48 of a building or
11 other structure. The blanks 10 are formed into
12 building blocks 12 which are then assembled
13 together. The blocks are laid on top of one another
14 so that the projecting tabs 34 of the lower block
15 locate in the slots 32 of the block being laid on
16 top. The blocks 12 may be laid straight on top of
17 one another, but it is preferable to lay each layer
18 offset from the lower layer by one half block
19 length, as shown in Fig.4. When building the wall
20 48, fill material (not shown) may be poured down
21 into the hollow blocks 12 in order to provide
22 further strengthening and rigidity. Fig.4 also
23 illustrates optional facing plates 49 which may be
24 placed atop each block 12 in the uppermost layer of
25 the wall 48 once the fill material has been poured
26 in. The plates 49 are provided with slots (not
27 shown) which engage with the tabs 34 on the
28 uppermost blocks 12.

29

30 Fig. 5 illustrates how the building blocks 12 are
31 fixed together in the wall 48 shown in Fig.4. As
32 seen in Figs. 4 and 5, one building block 12 is laid

1 upon another so that the tabs 34 of the lower block
2 12 engage with the slots 32 in the base of the upper
3 block. As discussed above, the blocks 12 may either
4 be stacked upon one another, or else laid in an
5 offset fashion such that upper block 12 is offset
6 from the lower block 12 by one half length. Once
7 the blocks 12 are in the desired position and the
8 tabs 34 are in the corresponding slots 32, the
9 building blocks 12 are secured together by bending
10 the tabs 34 inwardly until they lie flush with the
11 side flange portions 24 of the upper block, as seen
12 in Fig.5. The tabs 34 may be bent by hand or by
13 using a tool.

14

15 Figs. 6 and 7 show views of a modified version of
16 the block described above. The majority of the
17 features of the modified block 500 are shared with
18 the block 12 described above, and will therefore not
19 be described further here. The modification to the
20 block 500 is to introduce additional fixing slots
21 502,504 on each panel 14-20 to ensure that the
22 blocks 500 remain securely fixed together when
23 formed into a wall. As seen in Fig.6, each panel
24 14-20 has an upper fixing slot 502 and a lower
25 fixing slot 504. In the illustrated embodiment, the
26 side panels 18,20 have pairs of upper and lower
27 fixing slots 502,504, although they may also have
28 only one upper fixing slot 502 and one lower slot
29 504 if desired. The upper and lower fixing slots
30 502,504 are each located adjacent the top and bottom
31 of each panel 14-20, respectively.

32

1 Fig. 7 shows a number of blocks 500 arranged in a
2 wall. The blocks 500 are arranged upon each other
3 as previously described, with the tabs 34 of the
4 lower block 500 locating in the tab receiving slots
5 32 of the upper block 500. However, with the
6 modified blocks 500, plastic cable ties 510 are also
7 introduced to hold the blocks 500 together. With
8 the blocks arranged upon one another, the male
9 components of the cable ties 510 are threaded out of
10 the upper block 500 via the lower fixing slots 504
11 and into the lower block 500 via the corresponding
12 upper fixing slots 502 in the lower block. The male
13 components of the ties 510 are then finally threaded
14 up through the tab receiving apertures 32 in the
15 upper block 500 where they are fastened through the
16 female components of the ties in the bottom of the
17 upper block 500. Once the ties 510 are fastened,
18 the blocks 500 are held together in the wall.

19

20 In order to make the blocks 12 easily transportable,
21 the blanks 10 illustrated in Fig.1 are able to be
22 flat packed for easy storage and transportation.
23 Fig. 8 is an end view of the blanks 10 when stored
24 for transportation. The first two blanks 10 are
25 laid so that their longitudinal sides provided with
26 the tabs 34 (the second longitudinal sides, as
27 described above) abut one another. With the blanks
28 10 laid in this manner, the pre-bent side flange
29 portions 24 of each blank 10 face one another, with
30 the blanks 10 each having a substantially L-shaped
31 profile when viewed end-on, as in Fig.8. Further
32 blanks are then placed one after another on top of

1 these first blanks, such that the second
2 longitudinal sides of the blanks 10 overlap in the
3 centre of the stack and are interleaved as more
4 blanks are added. Eventually, the stacked blanks 10
5 will resemble a truncated pyramid shape, as shown in
6 Fig.8, as each new blank is laid upon the previous
7 blank so that the side flange portions 24 of each
8 blank lie flush inside one another. The stack is
9 completed when it is no longer possible to fit a new
10 blank in between the opposing side flange portions
11 of the interleaved blanks. A typical complete stack
12 of blanks 10 such as that shown in Fig.8 would
13 comprise 225 blanks. Furthermore, a typical
14 military air-lift pallet would be able to hold
15 eleven stacks, which would be enough to make some
16 2,475 blocks.

17

18 Referring now to Figs. 9-12, it may often be
19 necessary to include a doorway in a wall created
20 from the building blocks 12 described above. Figs.
21 9-12 illustrate a building element in the form of a
22 door lintel 50 that can be used in combination with
23 a wall of the previously described building blocks
24 in order to form such a doorway.

25

26 Fig. 9 shows a blank 54 from which the door lintel
27 50 is formed. As with the building blocks 12, in
28 the illustrated embodiment the blank 54 is either
29 cut or punched from a sheet of galvanised steel,
30 although any other sheet metal or suitable plastics
31 material may be used. The blank 54 comprises an
32 elongate body, or central, portion 58 and two side

1 portions 64,66 which are integrally formed with the
2 body portion 58. The body portion 58 and side
3 portions 64,66 are connected along a pair of
4 longitudinally extending fold lines 68. The body
5 portion 58 is also provided with a pair of end
6 flange portions 72 which are integrally formed with
7 the body portion 58 at respective ends thereof.
8 Each end flange portion 72 is connected to the body
9 portion 58 along a lateral fold line 70. The fold
10 lines 68,70 may either be perforated or scored in
11 order to aid folding during assembly. The body
12 portion 58 is also provided with a plurality of
13 slots 76,77 which, in the illustrated embodiment,
14 are provided in two substantially parallel lines.
15
16 Each side portion 64,66 is divided longitudinally in
17 two by a side portion fold line 78. The
18 longitudinal fold lines 78 are provided by either
19 perforating or scoring the blank 54 in order to aid
20 folding during assembly. Each side portion 64,66
21 also includes a plurality of tabs 80 formed
22 integrally therewith. The tabs 80 protrude
23 laterally from the free longitudinal edge of each
24 side portion 64,66 and are adapted to be engageable
25 with the tab receiving slots 76,77 in the body
26 portion 58, as will be explained below.
27
28 Although in the illustrated embodiment, the body
29 portion 58 is shown to have eight slots in each line
30 of slots 76,77 and the side portions 64,66 are each
31 shown to have eight corresponding tabs 80, it will

1 be appreciated that any appropriate number of slots
2 76,77 and corresponding tags 80 may be used.

3

4 Figs. 10 and 11 of the drawings illustrate a partial
5 cut-away and cross sectional view, respectively, of
6 the door lintel 50 formed from the blank 54 of Fig.
7 9. As illustrated, the door lintel 50 is formed by
8 firstly folding end flange portions 72 downward
9 along lateral fold lines 70 into a position whereby
10 the end flange portions 72 are substantially
11 perpendicular to the body portion 58. Next, the
12 side portions 64,66 are folded firstly along
13 longitudinal fold lines 68 and then along the
14 longitudinal fold lines 78 into a position whereby
15 the tabs 80 of side portions 64,66 are adjacent to
16 tab receiving slots 76,77 of the body portion 58.
17 The tabs 80 can then be located in the slots 76,77
18 and folded out towards the sides of the body portion
19 58 by hand or with a tool. Folding the side
20 portions 64,66 in the manner described leaves them
21 having a substantially V-shaped profile, as can be
22 seen best in Fig.11. These V-profiles provide
23 additional strength to the door lintel 50 when in
24 situ.

25

26 Fig. 12 illustrates how the door lintel 50 is
27 attached to a wall of building blocks 12 in order to
28 form a doorway in the wall. The door lintel 50 is
29 provided with a locating slot 56 at each end thereof
30 and is attached to the wall by locating the lintel
31 50 onto a building block 12 on either side of the
32 doorway. The door lintel 50 is positioned on each

1 of the pair of building blocks 12 such that the end
2 flange portions 72 of the lintel 50 enter the blocks
3 12 and lie flush with the end walls 16 of the
4 building blocks 12. At the same time, the tabs 34
5 protruding from the end walls 16 of the blocks 12
6 are engaged with the locating slots 56 of the lintel
7 50. Once the lintel 50 is successfully located, it
8 is secured in place by bending the tabs 34 of the
9 building blocks 12 so that they are substantially
10 flush with the body portion 58 of the lintel 50.

11

12 Referring now to Figs. 13 and 14, it will also
13 sometimes be desirable to include one or more
14 windows in a wall of the building blocks. Fig. 13
15 shows a blank 84 from which a window sill 86 is
16 formed. The blank 84 is either cut or punched from
17 a sheet of galvanised steel, although any other
18 suitable sheet metal or plastics material may be
19 used.

20

21 The blank 84 comprises a body portion 88 integrally
22 formed with first and second side portions 94, 96.
23 The body portion 88 and side portions 94, 96 are
24 connected along a first pair of longitudinal fold
25 lines 98. As with the previous embodiments
26 described, the fold lines may be perforated or
27 scored onto the blank 84 to aid folding. The body
28 portion 88 is also provided with integral end flange
29 portions 87 at either end thereof. The end flange
30 portions are connected to the body portion 88 along
31 respective lateral fold lines 85. The body portion

1 88 also includes a plurality of tab receiving slots
2 89 aligned longitudinally thereon.

3

4 The second side portion 96 is divided into three
5 sections 96A-96C by a further two longitudinal fold
6 lines 91,93 which run along the second side portion
7 96 substantially parallel to longitudinal fold lines
8 98. Again, the fold lines 91,93 are perforated or
9 scored on the blank 84 to aid folding during
10 assembly. The first side portion 94 is also divided
11 into three sections 94A-94C by an additional two
12 longitudinal fold lines 95,97 which also run
13 substantially parallel to the longitudinal fold lines
14 98.

15

16 The first side portion 94 further includes tabs 99
17 formed integrally with the outermost section 94C of
18 the side portion 94. The tabs 99 protrude laterally
19 from the outer edge of the outermost section 94C and
20 are adapted to be engageable with the tab receiving
21 slots 89 in the body portion 88.

22

23 As with the previously described embodiments, the
24 number of tabs 99 and corresponding slots 89 may be
25 greater or less than eight, depending on the
26 requirements of the particular application.

27

28 Fig. 14 illustrates a window sill 86 formed from the
29 blank 84 shown in Fig. 13. The window sill 86 is
30 formed by firstly folding end flange portions 87
31 downward along lateral fold lines 85 until they lie
32 substantially perpendicular to the body portion 88.

1 Next, the first side portion 94 is folded downwards
2 relative to the body portion 88 along longitudinal
3 fold line 98 until the first side portion 94 is
4 substantially perpendicular to the body portion 88.
5 The intermediate and outermost sections 94B,94C of
6 the first side portion 94 are then folded inwardly
7 along fold line 95 by substantially 90 degrees
8 relative to the inner section 94A, and the outermost
9 section 94C is then folded inwardly by 90 degrees
10 relative to the intermediate section 94B along fold
11 line 97. This folding forms the first side portion
12 94 into a substantially cuboidal shape, as seen best
13 in Fig. 12, from where the tabs 99 of the first side
14 portion 94 can be engaged with the tab receiving
15 slots 89 of the body portion 88. Once engaged with
16 the slots 89, the tabs 99 are bent by hand or using
17 a tool so that they lie flush with the upper surface
18 of the body portion 88.

19
20 Once the first side portion 94 has been folded into
21 its desired shape to form the load-bearing "body" of
22 the window sill 86, the second side portion 96 can
23 be folded to form the protective "canopy" of the
24 window sill 86. To create the canopy, the second
25 side portion 96 is folded downwards relative to the
26 body portion 88 along longitudinal fold line 98
27 until it lies at substantially 90 degrees to the
28 body portion 88. Next, the intermediate and
29 outermost sections 96B,96C of the second side
30 portion 96 are bent upwardly relative to the inner
31 section 96A along fold line 91 until the
32 intermediate section 96B lies at angle of

1 approximately 45 degrees relative to the inner
2 section 96A, as seen best in Fig.14. Finally, the
3 outermost section 96C is folded downwards relative
4 to the intermediate section 96B along fold line 93
5 until the outermost section 96C lies in a plane
6 substantially parallel to that of the inner section
7 96A. As an option, the outermost section 96C may
8 also be provided with a further longitudinal fold
9 line (not shown) which allows a lip to be formed on
10 the outermost section 96C such that a rounded edge
11 is provided. The window sill is then ready to be
12 attached to a wall of building blocks, such as that
13 shown in Fig.14.

14

15 Figs 15(a)-(c) show a second embodiment of a
16 building block in accordance with the present
17 invention. In this second embodiment, the block 100
18 has a body portion 101 and four separate connecting
19 members 102-108. The connecting members 102-108 are
20 formed from a different material to that of the body
21 portion 101, unlike in the first embodiment where
22 the entire block is formed from a single sheet of
23 material. Fig. 15(a) shows the separate components
24 from which the building block 100 is formed. In
25 this embodiment, the connecting members 102-108 are
26 either cut or punched from a sheet of galvanised
27 steel, although it should be understood that any
28 other suitable sheet metal or plastics material may
29 be used. The body portion 101 is formed from an
30 extruded cellular plastics sheet. An example of a
31 suitable sheet from which to form the body portion
32 101 is the extruded cellular polypropylene sheet

1 manufactured under the Trade Mark CORREX by
2 Kayserberg Plastics of Gloucester, United Kingdom.
3 However, it should be understood that the body
4 portion 101 may alternatively be formed from a
5 variety of other suitable materials including, by
6 way of example, the paper-covered polymer sheet
7 material manufactured under the Trade Mark PARATEN
8 by Frantschach AG of Vienna, Austria.

9

10 The body portion 101 is divided into two end panels
11 114,116 and two side panels 118,120 which are
12 integrally formed and connected along three fold
13 lines 122 which extend laterally across the body
14 portion 101 at intervals along the length thereof.
15 The fold lines 122 are formed by perforations made
16 in the body 101 to aid folding during assembly, as
17 will be explained below. The fold lines can also be
18 provided in these materials by way of slots through
19 the material or else by reducing the thickness of
20 the panels at certain points to facilitate bending
21 of the panels into the required shape.

22

23 A lower connecting member 102 is adapted to be fixed
24 to the bottom longitudinal edge of the body 101.
25 The lower connecting member has four integral flange
26 portions 124 which correspond to each of the end and
27 side panels 114,116,118,120 of the body 101. Each
28 of the flange portions 124 lies substantially
29 perpendicular to the lower connecting member 102 and
30 is connected thereto along a fold line 123. Each
31 fold line 123 is created by scoring or a similar
32 technique on the surface of the lower connecting

1 member 102. Each side flange portion 124 is also
2 provided with chamfers 126 at either end thereof to
3 allow the lower connecting member 102 to be formed
4 into a substantially rectangular shape, as will be
5 described below. The side flange portions 124
6 further include tab receiving slots 132 formed
7 adjacent the fold lines 123.

8

9 An upper connecting member 104 is adapted to be
10 fixed to the top longitudinal edge of the body 101.
11 The upper connecting member 104 includes integrally
12 formed tabs 134. The tabs 134 protrude laterally
13 from the upper connecting member 104 so as to be
14 engagable with the tab receiving slots 132 in the
15 lower connecting member of an adjacent block when
16 the connecting members are fixed to the body 101.

17

18 A first end connecting member 106 is adapted to be
19 fixed to a first end of the body 101. The first end
20 connecting member 106 has an integral end flange
21 portion 138 which connects with the end connecting
22 member 106 along a fold line 140. As with the fold
23 lines 123 of the lower connecting member 102, the
24 fold line 140 is formed on the end connecting member
25 106 by scoring or a similar technique. Prior to
26 final assembly, the end flange portion 138 is folded
27 along fold line 140 so that it lies substantially
28 perpendicular to the end connecting member 106, as
29 shown in Fig.15(a).

30

31 The end flange portion 138 further includes tab
32 receiving slots 142 formed on the end flange portion

1 138 adjacent the fold line 140. These tab receiving
2 slots 142 are intended to receive tabs 144
3 integrally formed on a second end connecting member
4 108 adapted to be fixed to the second end of the
5 body 101. The tabs 144 protrude longitudinally from
6 the second end connecting member 108 and are adapted
7 to be engageable with the tab receiving slots 142 in
8 the first end connecting member 106. Although the
9 first and second end connecting members 106,108 are
10 illustrated as having two slots 142 and two
11 corresponding tabs 144, respectively, it should be
12 appreciated that any suitable number of slots 142 or
13 tabs 144 may be used.

14

15 The steel connecting members 102-108 and plastics
16 body portion 101 are fixed together prior to form
17 the building block. This fixing can be by any
18 conventional means such as, for example, riveting,
19 adhesion or crimping. In one preferred embodiment,
20 the metal connecting members 102-108 can be folded
21 over the edges of each corresponding panel 114-120
22 of the body 101 and then crimped in place.

23

24 Fig. 15(b) illustrates a building block 100 formed
25 from the components shown in Fig. 15(a). In the
26 illustrated embodiment, the building block 100 is
27 formed into a substantially cuboid shape by folding
28 each of the panels 114-120 and the associated
29 connecting members 102-108 fixed thereto along the
30 fold lines 122. Thus, the end and side panels 114-
31 120 define the outer perimeter and shape of the
32 block, and each form a face of the building block

1 100. The building block is secured in this form by
2 engaging the tabs 144 of the second end connecting
3 member 108 with the tab receiving slots 142 of the
4 first end connecting member 106. The end panel 114
5 lies flush with the side flange portion 138 of the
6 first end connecting member 106 and the tabs 144 are
7 first manipulated so as to protrude through tab
8 receiving slots 142 and then bent back to fix the
9 end flange portion 138 and end panel 114 together.
10 Depending on the thickness of the sheet of material
11 being used, the tabs can be manipulated either by
12 hand or else by using a suitable tool.

13

14 As best illustrated in Fig. 15(c), the chamfered
15 side flange portions 124 of the lower connecting
16 member 102 form a base for the building block 100
17 that provides additional strength. Fig. 15(c) also
18 shows the arrangement of the slots 132 on the side
19 flange portions 124 of the lower connecting member
20 102 once the body 101 has been formed into the
21 building block 100.

22

23 Figs. 16(a)-(f) show various detail views of a third
24 embodiment of the building block. The third
25 embodiment of the block, generally designated 200,
26 is similar to the second embodiment in that the body
27 201 is formed from an extruded cellular plastics
28 material and is divided into two end panels 214,216
29 and two side panels 218,220. Panels 214-220 are
30 integrally formed and connected along three fold
31 lines (not shown) which extend laterally across the
32 body 201 at intervals along the length thereof.

1 Where the third embodiment differs from the second
2 embodiment is that the metal connecting members have
3 been replaced with plastic connecting members 202-
4 208. As best shown in Figs. 16(b)-(f), the
5 connecting members 202-208 are provided with
6 substantially U-shaped channels 222. The edge of
7 each panel 214-220 of the body 201 has a tongue 223
8 extending outwardly along substantially the length
9 thereof. The tongues 223 are sized so as to be held
10 in the channels 222 of the connecting members 202-
11 208. This can be done by snap fit, friction fit or
12 a similar technique. Once the tongues 223 are
13 fitted in the channels 222, the channels 222 can be
14 crimped in order to strengthen the fix between the
15 body 201 and connecting members 202-208. An
16 adhesive may also be applied to the joints for
17 further strength.

18

19 Each of the lower and upper connecting members
20 202,204 is provided with a number of fasteners for
21 securing adjacent blocks either above or below the
22 block 200. The fasteners of this third embodiment
23 are snap fasteners comprising a male part 232 which
24 is either fixed to, or integrally formed with, the
25 connecting members 202,204. The fasteners further
26 comprise an elongate fastener strip 234 which is
27 provided with a female part 236 at either end
28 thereof. In order to connect two blocks together, a
29 fastener strip 234 is snap fastened to a pair of
30 corresponding male parts 232 in adjacent blocks.
31 This is best shown in Fig. 16(f), where two side
32 panels 220,220' are connected via their respective

1 upper and lower connecting members 204, 202 and the
2 fastener strip 234 fastened to the two male parts
3 232 of the connecting members 204, 202.

4

5 As shown in Fig. 16(b), the lower connecting member
6 202 is provided with a lateral stiffening web 240
7 which extends inwardly from the channel 222 at
8 substantially 90 degrees. This web 240 provides
9 additional stiffness and rigidity to the block 200
10 when fully formed and in use. The web 240 is also
11 provided with a locating guide 242 extending
12 downwards therefrom at substantially 90 degrees to
13 the web 240. This guide runs the length of the
14 connecting member 202 and therefore runs around the
15 perimeter of the block 200 when fully formed. The
16 guide 242 ensures that the block 200 will fit
17 correctly on top of a lower block when in use. The
18 guide can be broken midway along each longitudinal
19 side of the block in order to allow blocks to be
20 placed on one another offset by a half block length.
21 This break in the guide ensures that the block 200
22 will accommodate the connecting member 204 forming
23 the lateral ends of the block below when the offset
24 arrangement is desired.

25

26 Figures 16(d) and (e) show alternative arrangements
27 for connecting the side panel 220 and end panel 214
28 together to form the block 200. In the example
29 shown in Fig. 16(d), each of the first and second
30 end connecting members 206, 208 is provided with a
31 first substantially U-shaped channel 222 for
32 accommodating the tongues 223 of the body panels

1 214,200 and a second substantially U-shaped channel
2 242. The first and second channels 222,242 of the
3 first end connecting member 206 are formed
4 substantially perpendicular to one another, whereas
5 the first and second channels 222,242 of the second
6 end connecting member 208 are formed substantially
7 parallel with one another. In this way, when the
8 first and second end connecting members 206,208 are
9 brought together, the second channels 242 of each
10 connecting member 206,208 accommodate one another,
11 thus forming a "butcher's grip" connection between
12 the two connecting members 206,208. This ensures
13 that where the block 200 is to be filled with
14 material for rigidity, the connection between the
15 two connecting members 206,208 will resist the
16 increased internal pressure.

17

18 The alternative connection shown in Fig. 16(e) is
19 similar to that shown in Fig. 16(d). However, in
20 this alternative connection, the tongue 223' of the
21 end panel 214' is shorter than those previously
22 described. At the same time, the second end
23 connecting member 208' is extended so that the
24 second channel 242' is deeper than those previously
25 described. The first and second end connecting
26 members 206,208 fit together in the same manner as
27 described above, but with the connection being
28 restricted to the same depth as the thickness of the
29 body 201 and connecting members 206,208.

30

31 Fig. 16(f) shows a detail view of the connection
32 between adjacent blocks, as described above. Also

1 shown is the web 240 and guide 242 on the lower
2 connecting member 202 of the upper block. It can
3 also be seen in Fig. 16(f) that the web includes a
4 slot 243 located inward of the guide 242. This slot
5 243 is provided to accommodate the fastener strip
6 234 when connecting the adjacent blocks.

7

8 An alternative means of connecting adjacent blocks
9 is shown in Figs. 17(a)-(c). The connecting members
10 shown in these figures have an L-shaped section, as
11 opposed to the U-shaped section of the connecting
12 members shown in Figs. 16(a)-(f). However, it
13 should be understood that either shape of section
14 can be utilised for the embodiment of connecting
15 member shown in Figs. 17(a)-(c). Connecting members
16 having the L-shaped section can be directly adhered
17 to the body if crimping the connecting members to
18 the body panels cannot easily be accomplished.
19 There would therefore be no need for the tongues and
20 channels on the panels and connecting members,
21 respectively.

22

23 In order to fix the adjacent blocks together, as
24 shown in section detail in Fig. 17(a), each upper
25 connecting member is provided with a nib, or detent,
26 305 which projects inwardly towards the centre of
27 the formed block from the side panel 320. Each
28 lower connecting member 302 has a web 340 which also
29 extends inwardly towards the center of the formed
30 block at substantially 90 degrees to the lower
31 connecting member 302. Integrally formed with the
32 web 340, and projecting downwardly therefrom, is a

1 resilient catch 342. The catch 342 is adapted to
2 engage the corresponding detent 305 of the upper
3 connecting member 304 such that the connecting
4 members 302,304, and hence the adjacent blocks, are
5 locked together.

6

7 Fig. 17(b) shows a further embodiment of the
8 connection between first and second end connecting
9 members 306,308 when forming blocks using the L-
10 section connecting members of Fig. 17. The
11 connecting members 306,308 are first fixed to the
12 side panel 320 and end panel 314, respectively,
13 preferably by adhesion, although alternative fixing
14 methods may be used. Save for the use of L-section
15 connecting members, the connection shown in Fig.
16 17(b) is substantially the same as that shown in
17 Fig. 16(e). However, the connection shown here
18 differs from that of Fig. 16(e) in that the
19 connecting members 306,308 are each provided with a
20 resilient catch 350. The catches 350 of each
21 connecting member 306,308 snap together in the same
22 "butcher's grip" arrangement described above.
23 Again, this arrangement prevents the formed block
24 from coming apart as a result of internal pressure
25 from fill material inside the block.

26

27 Fig. 17(c) shows a detail view of the blanks stored
28 ready to form blocks. It can be seen that the lower
29 connecting members 302 and their webs 340 ensure
30 that the panels (only end panel 314 is shown here)
31 and connecting members can be flat packed ready for
32 transportation to a construction site.

1
2 A fourth embodiment of building block is shown in
3 the detail views of Figs. 18(a)-(c). In this
4 embodiment, the body panels are formed as before.
5 As can be seen from Fig. 18(a), the body 401 of the
6 block is formed from panels made of extruded
7 cellular plastics sheet, as before. Although only
8 side panel 420 is shown in Fig. 18(a), each panel is
9 formed the same, and includes a plurality of cells
10 403 which extend across each panel. An example of
11 the connecting members used in this embodiment is
12 also shown in Fig. 18(a) and is generally designated
13 402. Connecting members 402 such as that shown can
14 be used for both the upper and lower connecting
15 members of the block. The connecting member 402 is
16 comb-like, in that it has a plurality of spaced
17 apart teeth, or prongs, 422. Although the teeth 422
18 are spaced apart, they are relatively closely packed
19 such that a number of adjacent teeth 422 can fit
20 inside one cell 403 of the panels. In the example
21 shown the teeth 422 are plate-like in shape, but it
22 should be understood that any suitable shape may be
23 used. All of the teeth 422 of each connecting
24 member 402 are integrally formed with a
25 strengthening rib 440, which runs the length of the
26 connecting member 402. The connecting members 402
27 can run the length of each panel, or else they can
28 be shortened and only applied at the joints between
29 panels and adjacent blocks.

30

31 Fig. 18(b) shows in plan the connection between side
32 panel 420 and end panel 414. As with the previously

1 described embodiments, first and second end
2 connecting members 406,408 are employed to connect
3 the two panels 420,414 together and hence form the
4 closed block. Each connecting member 406,408 has a
5 toothed portion such as that shown in Fig. 18(a)
6 which fixes the connecting member 406,408 to its
7 respective panel 420,414 via the teeth 422 entering
8 the cells 403 of each panel 420,414. These end
9 connecting members 406,408 are also provided with a
10 resilient catch 450. The catches 450 of each
11 connecting member 406,408 again snap together in the
12 same "butcher's grip" arrangement described above.
13 As before, this arrangement prevents the formed
14 block from coming apart as a result of internal
15 pressure from fill material inside the block.

16 .
17 Fig. 18(c) shows a detail section view of adjacent
18 blocks connected together via side panels 420,420'.
19 Each tooth 422 of each connecting member 402 is
20 attached to the web 440 substantially in the middle
21 thereof. As a result, the web 440 divides each
22 tooth 422 into upper and lower teeth 422a,422b. In
23 Fig. 18(c) it can be seen that the lower teeth 422b
24 of the connecting member 402 slide downwards into
25 the cells 403 of the lower side panel 420. Once the
26 connecting member 402 is fixed in the lower side
27 panel 420 (and other connecting members are located
28 in a similar manner at locations around the upper
29 perimeter of the block 400), the upper block 400' is
30 brought down on top of the first block 400 such that
31 the upper teeth 422a of the connecting member 402
32 enter the cells 403' of the side panel 420'. As a

1 result, the two adjacent blocks 400, 400' are now
2 fixed together and the fix can be further
3 strengthened by the application of an adhesive to
4 either or both the upper and lower teeth 422a, 422b.
5 Where appropriate the connecting members 402 can be
6 modified so as to form joints at the corners of
7 blocks. This can be achieved by introducing
8 appropriately large gaps between sets of teeth and
9 also mitres in the web to allow the connecting
10 members to be bent through the required angle.

11

12 It should be understood that although the teeth
13 illustrated in the connecting members 402 are plate-
14 like members, they could also engage with the
15 cellular panels 420 via alternative means. For
16 example, the teeth could be thicker, block-like
17 members dimensioned and spaced so as to directly
18 engage in the cells 403 of the panel 420. The teeth
19 could also be short, rod-like prongs which engage in
20 the cells 403 of the panel 420.

21

22 In addition, and as also explained elsewhere in this
23 specification, each of the connecting members
24 described herein, including those shown in Figs.
25 18(a)-(c) do not necessarily have to be formed in
26 one continuous length to cover the entire perimeter
27 of the building element. Instead, the connecting
28 members can be formed as single members which can
29 attach to the panels of the building element
30 individually. Such individual connecting members
31 can also be provided with strengthening webs having
32 45 degree cut-away ends, so as to not interfere with

1 adjacent connecting members if fitted at the corners
2 of a building element such as the blocks shown as
3 examples herein.

4

5 The present invention provides a number of building
6 blocks which are formed from sheets of metal or
7 plastics, or a combination of the two. The blanks
8 for these blocks can be punched or cut from the
9 sheet of material and then flat packed for easy
10 transportation and storage. The blanks can be
11 transported to locations where raw building
12 materials are in short supply and then assembled in
13 a very straightforward manner using only the
14 builder's hands. If additional supplies are
15 available, such as rivets or adhesives for fixing
16 components, for example, then these may also be used
17 to further improve the strength of the formed
18 building elements. With the present invention,
19 there is therefore no need to source scarce
20 materials or specialist tools to assemble buildings
21 and structures from the building elements according
22 to the present invention.

23

24 It should be appreciated that the illustrated
25 building blocks may also be dimensioned so as to
26 form a cube shape, in order that half-size blocks
27 can be used to form a particular shape of wall or
28 structure. As already highlighted above, the first
29 embodiment of building block, the door lintel and
30 the window sill described herein have been formed
31 from a single sheet of galvanised steel, but any
32 other type of sheet metal or suitable plastics

1 material could be used, so long as a suitable
2 weatherproof coating or treatment has been applied.
3 Alternative materials include those used in respect
4 of the second, third and fourth embodiments of the
5 blocks. Furthermore, the tabs of the first
6 embodiment of the block, the lintel and window sill
7 have each been illustrated as being substantially
8 rectangular. However, it should be appreciated that
9 in order to aid engagement with the tab receiving
10 slots, the tabs may have rounded edges.

11

12 A further modification to the tabs would be to make
13 them longer so that they can not only fold flush
14 onto a panel or flange, but extend so that they can
15 be folded back upon themselves for extra strength to
16 the join. Alternatively, the tabs could be reduced
17 in length to such an extent that they are merely
18 used as positioning means which engage the tab
19 receiving slots but do not protrude through the
20 slots. In this alternative embodiment, the securing
21 of the building blocks in a wall would be carried
22 out by adding further tab receiving slots adjacent
23 the tabs and the tab receiving slots, and then using
24 wire or plastic ties through the slots to secure the
25 building blocks together.

26

27 Although the building blocks have been illustrated
28 as being formed from substantially planar side and
29 end panels, the panels may also be stamped with a
30 formation that adds strength to the panels (e.g. an
31 X-shaped stamp covering the majority of the panel)

1 The panels of the building blocks may also each be
2 provided with one or more punch-out discs. The one
3 or more discs are aligned with a corresponding one
4 or more discs in the opposite panel of the block.
5 If reinforcement of the blocks is desired, the discs
6 can be punched out to allow the blocks to receive
7 reinforcement rods which pass through the blocks to
8 provide additional strengthening.

9

10 The buildings and structures made from the blocks
11 may insulated and stabilised by filling each block
12 with a suitable filling material, such as concrete,
13 sand, earth, clay, gravel, rubble or any other
14 similar available material, depending on the
15 availability of such materials in then area of
16 construction. The blocks may also be made thermally
17 insulated or made fire-resistant by inserting
18 appropriate insulating foam or fire-retardant foam
19 into the blocks during construction.

20

21 A further application of the blocks would be as part
22 of a flood prevention system. A wall of the blocks
23 forms a first protection layer against the flood,
24 with a lower layer of blocks being anchored in the
25 ground by an appropriate means such as, for example,
26 scaffolding tubes. The tubes pass down through the
27 layered blocks into the ground. The scaffolding
28 tubes can be set in the blocks using cement or the
29 like to fix the tubes in place. In addition to the
30 first wall of blocks, a second wall may be
31 constructed to the rear of the first and
32 waterproofing may be applied to one or both of the

1 walls. The waterproofing may be a sheet membrane,
2 or any other type of waterproofing.

3

4 The building blocks can be utilised to form
5 foundations of buildings and other structures. For
6 example, four building blocks could be arranged to
7 form a substantially square base unit, and further
8 blocks could be stacked in a conventional vertical
9 manner on top of the base unit to a suitable height.
10 The building blocks would be filled with cement, or
11 another suitable material and reinforced with
12 typical reinforcing members such as the
13 aforementioned scaffolding tubes or steel
14 reinforcement rods, for example. The flexibility of
15 the arrangement of the blocks means that virtually
16 any configuration of foundation can be achieved.

17

18 A wall constructed from the building blocks of the
19 present invention also provides an ideal surface for
20 applying either an internal or external cladding
21 layer. The blocks can be sprayed with a suitable
22 treatment (e.g. for fire-proofing) and then the
23 cladding can be applied to the wall quickly and
24 cheaply by simply using self-tapping screws, or the
25 like, that penetrate the sheet material of the block
26 and fix the cladding thereto.

27

28 The blocks may also be utilised to form permanent
29 shuttering (not shown) for the foundations of
30 buildings or the like.

31

1 A yet further application of the building blocks is
2 that if the blocks are made from a sufficient
3 thickness and/or type of metal and/or plastics, they
4 can be used to form a building or structure that is
5 resistant to attack. Thus, the blocks can be used
6 to quickly and simply construct military and
7 security installations (e.g. checkpoints).

8 Buildings formed from the blocks would also be less
9 susceptible to ram-raid attacks, where an attempt is
10 made to drive a vehicle through the wall of a
11 building or installation.

12

13 Each of the building elements and their separate
14 components described herein can be formed from
15 either sheet metal or plastics, using the techniques
16 referred to above. In addition, although certain
17 examples given above describe the various components
18 of the elements as being formed separately (e.g. the
19 body portion and connecting members), it should be
20 understood that these components could be integrally
21 formed with one another by punching, moulding or a
22 similar technique. These one-piece elements would
23 be formed with all the necessary fold lines, flutes,
24 chamfers, cells and the like already thereon, so
25 that the elements can be simply folded into shape
26 and clipped or fixed in position.

27

28 These and other modifications and improvements may
29 be made to the above without departing from the
30 scope of the present invention.